**BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA**

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| Order Instituting Rulemaking to Adopt Biomethane Standards and Requirements, Pipeline Open Access Rules, and Related Enforcement Provisions. | Rulemaking 13-02-008 (Filed February 13, 2013) |

# COMMENTS OF THE CALIFORNIA HYDROGEN BUSINESS COUNCIL ON ASSIGNED COMMISSIONER'S RULING SEEKING COMMENT ON STAFF PROPOSAL ON RENEWABLE METHANE DEFINITION, JOINT UTILITY INTERCONNECTION TARIFF, AND CALIFORNIA COUNCIL ON SCIENCE AND TECHNOLOGY *UPDATED STATE OF SCIENCE REGARDING MAXIMUM PERMISSIBLE SILOXANE CONCENTRATION*

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## I. Introduction

The California Hydrogen Business Council (CHBC) appreciates the opportunity to provide comments on the Assigned Commissioner's Ruling filed on November 19, 2018.[1]

The CHBC's comments are primarily focused on the Ruling's Appendix A: Staff Proposal for Definition of Renewable Methane.

[1] The California Hydrogen Business Council (CHBC) is a California industry trade association with a mission to advance the commercialization of hydrogen in the energy sector, including transportation, goods movement, and stationary power systems to reduce emissions and dependence on oil. The views expressed in these comments are those of the CHBC, and do not necessarily reflect the views of all of the individual CHBC member companies. Members of the CHBC include Air Liquide; Advanced Technologies U.S..; Alameda-Contra Costa Transit District (AC Transit); American Honda Motor Company; Anaerobe Systems; Arriba Energy; Ballard Power Systems, Inc.; Bay Area Air Quality Management District (BAAQMD); Beijing SinoHytec; Black & Veatch; BMW of North America; California Air Resources Board (CARB); California Fuel Cell Partnership (CaFCP); CALSTART; Cambridge LCF Group; Center for Transportation and the Environment (CTE); Chiyoda Corporation; Coalition for Clean Air; Community Environmental Services; CP Industries; DasH2energy; Eco Energy International; EcoNavitas; ElDorado National – California; Energy Independence Now (EIN); EPC - Engineering, Procurement & Construction; Ergostech Renewal Energy Solution; EWII Fuel Cells LLC; FIBA Technologies; First Element Fuel; FuelCell Energy; GenCell; General Motors, Infrastructure Planning; Geoffrey Budd G&SB Consulting; Giner ELX; Gladstein, Neandross & Associates; Greenlight Innovation; GTA; GTM Technologies; H2B2 USA; H2Safe; H2SG Energy Pte; Hexagon Lincoln; Hitachi Zosen Inova ETOGAS; HODPros; Hydrogen Law; Hydrogenics; Hydrogenious Technologies; HydrogenXT; HyET - Hydrogen Efficiency Technologies; Hyundai Motor Company; ITM Power; Ivys; Johnson Matthey Fuel Cells; KORE Infrastructure; Kraft Powercon; Life Cycle Associates; Linde North America; Longitude 122 West; Loop Energy; Millennium Reign Energy; Mitsubishi Hitachi Power Systems Americas; Montreux Energy; Motive Energy; Natural Gas Fueling Solutions (NGFS); Natural Hydrogen Energy; Nel Hydrogen; Neo-H2; Neuman & Esser USA; New Flyer of America; Next Hydrogen; Noyes Law Corporation; Nuvera Fuel Cells; Pacific Gas and Electric Company (PG&E); Pacific Northwest National Laboratory (PNNL); PDC Machines; Planet Hydrogen; Plug Power; Politecnico di Torino; Port of Long Beach; Powertech Labs; Primidea Building Solutions; Proton OnSite; RG Associates; Rio Hondo College; Rix Industries; Sacramento Municipal Utility District (SMUD); SAFCell; Schatz Energy Research Center (SERC); Sheldon Research and Consulting; Solar Wind Storage; South Coast Air Quality Management District; Southern California Gas Company; Strategic Analysis; Sumitomo Corporation of Americas; Sumitomo Electric; Sunline Transit Agency; T2M Global; Tatsuno North America Inc.; Terrella Energy Systems; The Leighty Foundation; TLM Petro Labor Force; Toyota Motor Sales; Trillium - A Love's Company; University of California, Irvine; US Hybrid; Valley Environmental Associates; Vaughan Pratt; Verde; Vinjamuri Innovations; Winkelmann Flowform Technology; WireTough Cylinders; Yanli Design; Zero Carbon Energy Solutions.

## II. Main Recommendations for Definition of Renewable Methane

The CHBC believes that the definition of renewable methane ought to be guided by the following primary principles, outlined below and followed by a proposed revision of the definition, that align with current state policy objectives on climate protection, clean energy, and environmental preservation.

## III. The definition of eligible carbon sources for formation of Renewable Methane from hydrogen ought to be broadened beyond biogenic and atmospheric CO2 to other pathways that are emerging or may be developed that to not use fossil fuels and do not result in a net increase of carbon dioxide emissions.

The CHBC agrees that the pathways to converting renewable hydrogen into renewable methane should include CO2 source from biogenic and atmospheric sources, and appreciates that the Commission has asked for further guidance on what was meant by "climate neutral" in our proposed definition in the Opening Comments submitted in July 2018. To be clear, our intent was to leave room for potential emerging and future technologies that do not produce a net increase in CO2 emissions over the lifecycle. We believe this will help ensure flexibility to use technologies that may develop down the line, while remaining consistent with California's goal to achieve carbon neutrality by 2045, as called for in Executive Order B-55-18. Perhaps a better choice of words, to be aligned with state policy, would be "carbon neutral" instead of "climate neutral."

## IV. The CHBC recommends that the Commission broaden eligible sources of electricity as feedstock for Renewable Methane and hydrogen gas formation to create Renewable Methane beyond RPS eligible sources, to align with SB 100 which includes zero carbon, and SB 1369's definition of "green electrolytic hydrogen."

SB100 specifically lays out a vision for 100% clean electricity in California to come from not only RPS eligible sources, but also zero carbon sources by the end of 2045. SB 1369 gives further guidance in defining "green electrolytic hydrogen" as that which is made without the use of fossil fuels or steam methane reformation. Considering these two mandates, we recommend the Commission adopt a definition of Renewable Methane that is in line with these provisions, and specifically that the definition of energy inputs to create Renewable Methane and hydrogen gas used for Renewable Methane ought to be expanded beyond RPS eligible sources to also include zero carbon resources, which could be verified by the Commission in consultation with the Air Resources Board, much like they verify low carbon sources for the Low Carbon Fuel

Standard. Examples of useful zero carbon sources that the current definition would unfortunately prohibit include curtailed renewables and legacy large hydropower. Furthermore, the definition should make clear that RPS eligible sources need not come from generation that is co-located with hydrogen production, in order to enable the full potential of hydrogen to integrate renewable generation, reduce GHG, and leverage the existing asset of the natural gas system.

## V. The definition of Renewable Methane ought to be expanded to include the full suite of pathways that do not result in added CO2 emissions over their lifecycle, and similar injection protocols and interconnection standards ought to be available for all these pathways, along with incentives that can be rate-based and determined in the AB 3187 proceeding.

The CHBC previously proposed that Renewable Methane be defined exclusively as methane "formed by combining renewable hydrogen (generally from electrolysis) with $CO_2$ that is biogenic, captured from the atmosphere or other source of CO2 certified to be climate-neutral." (See our Opening Comments to this proceeding submitted in July 2018.) Our intent was to carve a definition for renewable hydrogen-derived methane, in order to end its historic and consistent exclusion from regulatory and policy discussions and decisions, which typically have focused only on bio-based methane. We greatly appreciate that the Commission has largely seen eye to eye with us. After conferring with industry experts and greater reflection, we have come to realize that limiting the definition of a term as broad at face value as Renewable Methane hydrogen derived pathways may be unnecessary and also confusing down the road. After all, biomethane, applying simple logic, is also renewable technically speaking. We think it is possible to achieve the important inclusion of hydrogen based methane, which we see as key to helping California reach its climate and clean energy goals, in a less confusing way. Therefore, we would like to amend our previous recommendation to instead ask that Renewable Methane be defined as big umbrella term that includes methane made by the broadest range possible of carbon neutral pathways, which specifically would include 1) combining hydrogen gas, sourced from non-fossil fuel-based materials, such as organic materials or water, with CO2 that is biogenic, captured from the atmosphere, or net zero carbon over its lifecycle; 2) anaerobic digestion to produce biomethane that meets the standards pursuant to Health and Safety Code 25421 c) *and* 3) emerging or future pathways that do not use fossil fuels and that do not result in a net increase of carbon dioxide emissions over their lifecycle. Examples of such emerging

pathways currently include methane derived from electromechanogenesis,[2] in which microbes consume electricity, CO2, and water, and methane derived from co-electrolysis that converts CO2 and water directly to methane while skipping the hydrogen step[3] – and there may well be pathways that are yet be discovered.

We furthermore believe that all types Renewable Methane should have similar injection protocols and interconnection standards, which could help streamline processes for the industry and regulators alike. They should furthermore all be eligible for similar incentives, which could be rate-based and figured out in the upcoming AB 3187 proceeding.

## VI. We generally agree with the Staff proposal that eligible renewable energy inputs used to create renewable methane should not be double counted, but recommend clarifying the language.

We agree that credits should not be double counted. If the methane is used for stationary purposes, it should still be eligible for RECs and compliance obligations. If the renewable methane is used for transportation fuel, then it should take advantage of LCFS credits. One area that could benefit from clarification, however, is the language intended to ensure that the renewable attribute of the feedstock is retained with the product gas and not sold separately. In other words, we think it is important to make sure that the language does not inadvertently restrict any end use. For example, renewable energy not used for RPS compliance carries a renewable attribute available for RPS compliance at the other end of the pathway- i.e. while the power going in cannot be used for RPS compliance, the power coming back could be. A precise restriction is needed to require the renewable attribute be retained with, and not separated from the feedstock. The aim is to avoid any ambiguity on restrictions on energy input in forming renewable methane and the renewable methane's ultimate use for renewable transportation, power or other applications with full credit for its renewable attribute when used.

## VII. Recommended Revised Definition:

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[2] See: https://www.nrel.gov/news/features/2017/undersea-microbes-provide-path-to-energy-storage.html
[3] See developments at startup Opus 12: https://www.opus-12.com/

*Renewable Methane is methane formed by combining hydrogen[4], sourced from non- fossil fuel-based organic material or water, with ~~$CO_2$~~[5] carbon that is biogenic, captured from the atmosphere or derived from another source or process approved by the Commission that adds no net CO2 to the atmosphere on a full-cycle basis. The direct energy inputs used to create renewable methane and the hydrogen ~~gas~~ used for renewable methane formation must be sourced from an eligible renewable energy resource, as defined in Public Utilities Code Section 399.12(e) or from other carbon neutral (net zero carbon) sources as approved by the Commission. ~~Renewable energy inputs used to create renewable methane and the hydrogen gas used for renewable methane formation may not also be counted toward an RPS compliance obligation or claimed for any other program as renewable generation~~. For methane produced through the processes defined above to qualify as renewable methane, the renewable attributes of all renewable energy used in the production of renewable methane must be retained and not sold or used for compliance separate from the final use of the renewable methane.*

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*Renewable Methane is methane formed by combining hydrogen, sourced from non- fossil fuel-based organic material or water, with carbon that is biogenic, captured from the atmosphere or derived from another source or process approved by the Commission that adds no net CO2 to the atmosphere on a full-cycle basis. The direct energy inputs used to create renewable methane and the hydrogen used for renewable methane formation must be sourced from an eligible renewable energy resource, as defined in Public Utilities Code Section 399.12(e) or from other carbon neutral (net zero carbon) sources as approved by the Commission. For methane produced through the processes defined above to qualify as renewable methane, the renewable attributes of all renewable energy used in the production of renewable methane must be retained and not sold or used for compliance separate from the final use of the renewable methane.*

## VIII. Appendix B: Joint Utility Tariff Interconnection Proposal

The aforementioned biomethane technologies should also be eligible for the interconnection incentive offered to biomethane through the AB 1900 proceeding. The tariff proposal should

[4] We recommend deleting the word "gas" after hydrogen because the hydrogen may come directly from sources like biomass to form the methane, without ever forming hydrogen gas (H2) first. We believe it is important that the definition as broadly accepting of all renewable methane pathways as possible.

[5] We recommend changing "CO2" to "carbon" to ensure the definition is broadened to include gasification pathways to creating methane that use carbon but not necessarily carbon dioxide.

consider extending the tariff, rather than only focusing on injection standards. The interconnection incentive itself should be expanded or rate-based, per the AB 3187[6] mandate, to consider rate-basing interconnection incentives by June 2019. If defined properly per comments in Section II, then these renewable methane technologies should be eligible for that incentive as well.

## IX. Next Step

The definition of Renewable Methane is among the critical first steps in this proceeding, and the CHBC is heartened by the progress to date. We also continue to urge the Commission in its next steps to examine and establish interconnection and injection standards for hydrogen produced via zero and low carbon pathways, as specified in our previous comments. Per D.14-01-034, the Commission ought to determine the upper limits for hydrogen injection into the common carrier system, and this should be based on a comprehensive and current evidentiary review carried out in a series of workshops and either within the scope of this phase of the proceeding or in a parallel track to this proceeding.

## X. Conclusion

The CHBC thanks the Commission for their consideration and looks forward to working together to facilitate adoption of a broad range of renewable gases in California, including renewable hydrogen and renewable methane derived from renewable hydrogen.

**Respectfully submitted,** **Dated: December 7, 2018**

Emanuel Wagner
Deputy Director
**California Hydrogen Business Council**

[6] Assembly Bill No. 3187, CHAPTER 598, "*An act to amend Section 784.2 of the Public Utilities Code, relating to gas corporations*". Filed with Secretary of State September 20, 2018. Available at: http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB3187